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Rejection of claims under 35 USC 102:

MPEP §2131 provides that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. The identical invention must be shown in as complete detail as contained in the claim. The elements must be arranged as required by the claim. In this regard, Cornie fails to support the rejection of claims 1 and 5-9 under 35 USC 102.

Cornie describes an investment molding process wherein a fugitive net-shaped mold (or preform) is surrounded by an impervious investment mold, and then molten metal is forced into the fugitive mold but is unable to penetrate into the surrounding investment mold. Once the molten metal hardens, the investment mold is removed to reveal the net-shaped metal or metal matrix composite (MMC) structure. Thus, the final structure of Cornie is cast into the location of the fugitive mold, and the fugitive mold is displaced during the casting process. The process of Cornie enables controlling only the external dimensions of a solid structure.

In contrast, the present invention includes a fugitive inner mold 14 that controls an internal dimension of a hollow cast structure 18 (ceramic insulating material). The outside dimension of the part is controlled by the size of the cavity 16 between the inner mold and an outer mold 12. The fugitive inner mold is not displaced during the casting process.

Looking now to specific limitations, independent claims 1 and 8 include the step of "defining a cavity between an inner mold comprising a fugitive material portion and an outer mold." There is no cavity defined by Cornie, thus he fails to anticipate this step. However, if one considers the fugitive mold or preform to be defining a cavity, then the "cavity" of Cornie is not defined between inner and outer molds, but rather, it is placed as an innermost object of the molding device, thereby again failing to anticipate this claim limitation. This difference is very significant because it allows the process of Cornie to be used to cast only solid structures, whereas claims 1 and 8 define processes that are used to cast hollow structures.

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Further, claims 1 and 8 include the step of "casting a layer of ceramic insulating material within the cavity." Here, again, since Cornie has no cavity, he fails to anticipate this step. Alternatively, if one considers the fugitive mold to be a "cavity", then Cornie is not casting a "layer" but rather a solid part.

Further, claims 1 and 8 include the step of "performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material; and removing the fugitive material and removing the inner mold;." Cornie has no inner mold and therefore he can not anticipate this step. In the alternative, if one considers the fugitive mold of Cornie to an "inner mold", then such fugitive inner mold is displaced by the casting process and is not available for support of any subsequent mechanical operation. Finally, if one considers the preform of Cornie to be an "inner mold", then such preform inner mold is never removed and Cornie would actually teach away from the quoted limitations of claims 1 and 8.

As to claim 7, Cornie describes only the casting of liquid metal material, and therefore he can not anticipate the ceramic curing step of claim 7.

In summary, Cornie does not support the rejection of any of claims 1 and 5-9 under 35 USC 102, and this rejection should be withdrawn.

Rejection of claims under 35 USC 103:

The Applicants first traverse the rejections under 35 USC 103 that rely upon Li. Li describes an improved casting process for a hollow ceramic structure that is cast into a cavity defined between a fugitive inner mold and an outer mold. In that regard, the Applicants appreciate the citation to Li because it is a material reference that defines aspects of the prior art. However, the Examiner admits that Li does not disclose the Applicants' invention, and he relies upon the knowledge of one skilled in the art to modify Li to establish a *prima facie* case for obviousness of the rejected claims. However, as will be discussed below, the modification of Li that is proposed by the Examiner would destroy the functionality of Li, and therefore, no *prima facie* case for obviousness can be made.

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The casting process of Li eliminates cracking of a ceramic structure by very quickly removing the fugitive inner mold once the green body is formed. See, for example, column 2, lines 49-60, where Li explains that the fugitive inner mold is dissolved within 10 seconds after it is immersed into solvent, and it is immersed into the solvent "as soon as the water disappears from the top of the slip-cast block" and the green body is formed. Time is of the essence to Li because it is the minimization of drying shrinkage stresses and the elimination of wax insert expansion stresses (column 3, lines 5-8) that enable the Li invention. The Examiner suggests that the inner mold of Li could remain in place until the outer mold is removed and until a mechanical machining step is performed. However, such a delay would result in cracking of the ceramic part of Li, thereby destroying the functionality of the Li invention. Accordingly, the *prima facie* case of obviousness cannot properly be made and all of the claim rejections under 35 USC 103 that rely on Li should be withdrawn. The additional steps of the present invention do not create a concern regarding cracking in the present invention because it is directed to casting ceramic insulating material, such as the friable-grade insulation described at page 3, lines 17-19 of the specification, which is generally more porous, less subject to shrinkage, and less brittle than the structural ceramic silicon nitride material of Li.

The Applicants now traverse the rejections of claims 2, 3, 10-18 under 35 USC 103 that rely upon Cornie. As discussed above with respect to the rejections under 35 USC 102, Cornie fails to teach the limitations of these claims related to the definition of a cavity between inner and outer molds and to performing any mechanical operation on an outside dimension while the inner mold remains in place. The addition of the teaching of Ress or Kobashi does not compensate for this lack of teaching of Cornie. Thus, the claim rejections under 35 USC 103 that rely on Cornie should be withdrawn.

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Conclusion:

Reconsideration of the amended application in light of the above Remarks and allowance of claims 1-3 and 5-18 are respectfully requested.

Respectfully submitted,



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